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BY EXPRESS MAIL NO. EL387308396US
Attorney Docket No. KOIK-Q9028
09/530143
526 Rec'd PCT/PTO 25 APR 2000

IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

In re International Application of

International Serial No. PCT/JP99/04957
International filing date: September 10, 1999
For: Robot Apparatus, Control Method for Robot Apparatus, Displaying Method and Furnishing Medium

VERIFICATION OF TRANSLATION

Honorable Commissioner of Patents and Trademarks
Washington, D.C. 20231
Sir:

Eiichi Tamura, a member of A.KOIKE & CO., of 11-Mori Bldg., 6-4, Toranomon 2-chome, Minato-ku, Tokyo 105-0001 Japan, declares:

(1) that he knows well both the Japanese and English languages;

(2) that he translated the above-identified International Application from Japanese to English;

(3) that the attached English translation is a true and correct translation of the above-identified International application to the best of his knowledge and belief; and

(4) that all statements made of his own knowledge are true and that all statements made on information and belief are believed to be true, and further that these statements are made with the knowledge that willful false statements and the like are punishable by fine or imprisonment, or both, under 18USC 1001, and that such false statements may jeopardize the validity of the application or any patent issuing thereon.

April 18. 2000
Date

Eiichi Tamura
Eiichi Tamura

BY EXPRESS MAIL NO. EL387308396US
Attorney Doc. No. KOIK-Q9028

09/530143

526 Rec'd PCT/PTO 25 APR 2000

IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

APPLICANT :
APPLICATION No. : Group Art Unit :
FILING DATE : Examiner :
TITLE :

Hon. Commissioner of Patents and Trademarks,
Washington, D.C. 20231

SIR:

CERTIFIED TRANSLATION

I, Misako Tanimoto, am an official translator of the Japanese language into the English language and I hereby certify that the attached comprises an accurate translation into English of Japanese Application No. 10-256465, filed on September 10, 1998.

I hereby declare that all statements made herein of my own knowledge are true and that all statements made on information and belief are believed to be true; and further that these statements were made with the knowledge that willful false statements and the like so made are punishable by fine or imprisonment or both, under Section 1001 of Title 18 of the United States Code and that such willful false statements may jeopardize the validity of the application or any patent issued thereon.

April 17, 2000
Date

Misako Tanimoto

526 Rec'd PCT/PTO 25 APR 2000
09/530143

Patent Office

Japanese Government

This is to certify that the annexed is a true copy of the following application as filed with this Office.

Date of Application: September 10, 1998

Application Number: Patent Application
Ser. No. 10-256465

Applicant: Sony Corporation

July 16, 1999

Commissioner,

Patent Office Takeshi Isayama

[Document Name]	Patent Application
[Reference Number]	9800562103
[Filing Date]	September 10, 1998
[To]	Hon.Commissioner, Patent Office
[IPC]	G06F 19/00
[Title of the Invention]	ROBOT APPARATUS, CONTROL METHOD THEREFOR, AND PROVIDING MEDIUM
[Number of Claims]	5
[Inventor]	
[Address]	c/o Sony Corporation 7-35, Kitashinagawa 6-chome, Shinagawa-ku, Tokyo, Japan
[Name]	Kotaro Sabe
[Inventor]	
[Address]	c/o Sony Corporation 7-35, Kitashinagawa 6-chome, Shinagawa-ku, Tokyo, Japan
[Name]	Masahiro Fujita
[Patent Applicant]	
[Identification Number]	000002185
[Name]	Sony Corporation
[Representative]	Nobuyuki Idei
[Patent Attorney]	
[Identification Number]	100082131
[Patent Attorney]	
[Name]	Yoshio Inamoto
[Telephone Number]	03-3369-6479
[Indication of Charge]	

[Number of Prepaid Ledger] 032089

[Amount] 21,000 yen

[List of Document]

[Document]	Specification	1
[Document]	Drawing	1
[Document]	Summary	1

[General Power of Attorney Number] 9708842

[Need of Proof] Yes

09/530143
526 Rec'd PCT/PTO 25 APR 2000

[Name of Document] SPECIFICATION

[Title of the Invention]

Robot Apparatus, Control Method Therefor, and Providing Medium

[Claims]

[Claim 1]

A robot apparatus having an emotional model changed by an external factor or an internal factor, the apparatus comprising:

detection means for detecting an external state;

storage means for storing data;

decision means for deciding an output of the emotional model based on a signal detected by the detection means;

discrimination means for discriminating whether the output of the decision means is greater than a predetermined threshold value or not; and

write means for writing data corresponding to the output in the storage means in the case where it is discriminated by the discrimination means that the output is greater than the predetermined threshold value.

[Claim 2]

The robot apparatus according to claim 1, further comprising read means for reading the data written by the write means.

[Claim 3]

The robot apparatus according to claim 1, further comprising rearrangement

means for rearranging the data written by the write means in accordance with the output of the emotional model.

[Claim 4]

A control method for a robot apparatus having an emotional model changed by an external factor or an internal factor, the method comprising:

a detection step of detecting an external state;

a storage step of storing data;

a decision step of deciding an output of the emotional model based on a signal detected at the detection step;

a discrimination step of discriminating whether the output at the decision step is greater than a predetermined threshold value or not; and

a write step of writing data corresponding to the output in the case where it is discriminated at the discrimination step that the output is greater than the predetermined threshold value.

[Claim 5]

A providing medium for providing a program which causes a robot apparatus having an emotional model changed by an external factor or an internal factor, to execute processing comprising:

a detection step of detecting an external state;

a storage step of storing data;

a decision step of deciding an output of the emotional model based on a signal

detected at the detection step;

a discrimination step of discriminating whether the output at the decision step is greater than a predetermined threshold value or not; and

a write step of writing data corresponding to the output in the case where it is discriminated at the discrimination step that the output is greater than the predetermined threshold value.

[Detailed Description of the Invention]

[0001]

[Technical Field to Which the Invention Pertains]

This invention relates to a robot apparatus, a control method therefor and a providing medium, and particularly to a robot apparatus, a control method therefor and a providing medium which enable intake and storage of external data in the case where an automatic mobile robot having an emotional model changed by an external factor and an internal factor is shifted to a predetermined state.

[0002]

[Prior Art]

As an automatic mobile robot aimed at collecting marine data, an underwater search robot, for example, has been developed. For an underwater search robot, it is desirable to collect and record as many data difficult to collect as possible. These data include, as an example, seawater temperature data, sea stream data, depth data, terrestrial data and picture data. The operations of extracting and analysing effective

data is usually carried out after the underwater search robot has returned to the water surface.

[0003]

[Problem to be Solved by the Invention]

However, in the automatic mobile robot, aimed at entertainment, protracted storage of meaningless data in the robot leads to increased memory costs.

[0004]

On the other hand, the operation of extracting effective data from the data stored in a robot is time- and labor-consuming.

[0005]

In view of the foregoing status of the art, it is an object of the present invention to enable extraction and recording of effective data alone in an automatic mobile robot.

[0006]

[Means to Solve the Problem]

According to claim 1, there is provided a robot apparatus having an emotional model changed by an external factor or an internal factor, the apparatus comprising: detection means for detecting an external state; storage means for storing data; decision means for deciding an output of the emotional model based on a signal detected by the detection means; discrimination means for discriminating whether the output of the decision means is greater than a predetermined threshold value or not; and write means for writing data corresponding to the output in the storage means in

the case where it is discriminated by the discrimination means that the output is greater than the predetermined threshold value.

[0007]

According to claim 4, there is provided a control method for a robot apparatus having an emotional model changed by an external factor or an internal factor, the method comprising: a detection step of detecting an external state; a storage step of storing data; a decision step of deciding an output of the emotional model based on a signal detected at the detection step; a discrimination step of discriminating whether the output at the decision step is greater than a predetermined threshold value or not; and a write step of writing data corresponding to the output in the case where it is discriminated at the discrimination step that the output is greater than the predetermined threshold value.

[0008]

According to claim 5, there is provided a providing medium for providing a program which causes a robot apparatus having an emotional model changed by an external factor or an internal factor, to execute processing comprising: a detection step of detecting an external state; a storage step of storing data; a decision step of deciding an output of the emotional model based on a signal detected at the detection step; a discrimination step of discriminating whether the output at the decision step is greater than a predetermined threshold value or not; and a write step of writing data corresponding to the output in the case where it is discriminated at the discrimination

step that the output is greater than the predetermined threshold value.

[0009]

In the robot apparatus according to claim 1, the detection means detects an external state and the storage means stores data. The decision means decides an output of the emotional model based on a signal detected by the detection means and the discrimination means discriminates whether the output of the decision means is greater than a predetermined threshold value or not. The write means writes data corresponding to the output in the storage means in the case where it is discriminated by the discrimination means that the output is greater than the predetermined threshold value.

[0010]

In the control method for a robot apparatus according to claim 4 and the providing medium according to claim 5, an external state is detected at the detection step and data is stored at the storage step. At the decision step, an output of the emotional model is decided based on a signal detected at the detection step, and at the discrimination step, it is discriminated whether the output at the decision step is greater than a predetermined threshold value or not. At the write step, data corresponding to the output is written in the case where it is discriminated at the discrimination step that the output is greater than the predetermined threshold value.

[0011]

[Mode for Carrying out the Invention]

A preferred embodiment of the present invention will now be described. To clarify the corresponding relation between each means of the present invention according to claims and the following embodiment, the features of the present invention are described, adding the corresponding embodiment (one example) inside parentheses subsequent to each means. However, this description is not intended to limit each means to the described embodiment.

[0012]

Specifically, the robot apparatus of claim 1, having an emotional model changed by an external factor or an internal factor, includes: detection means (e.g., sensor 61 of Fig.4) for detecting an external state; storage means (e.g., memory card 13 of Fig.2) for storing data; decision means (e.g., output selection unit 75 of Fig.4) for deciding an output of the emotional model based on a signal detected by the detection means; discrimination means (e.g., step S1 of Fig.5) for discriminating whether the output of the decision means is greater than a predetermined threshold value or not; and write means (e.g., step S3 of Fig.5) for writing data corresponding to the output in the storage means in the case where it is discriminated by the discrimination means that the output is greater than the predetermined threshold value.

[0013]

The robot apparatus of claim 2 further includes read means (e.g., step S11 of Fig.7) for reading the data written by the write means.

[0014]

The robot apparatus of claim 3 further includes rearrangement means (e.g., step S4 of Fig.5) for rearranging the data written by the write means in accordance with the output of the emotional model.

[0015]

Fig.1 shows the appearance shape of a pet type robot 1 to which the present invention is applied. The pet type robot 1 is made up of legs 2a to 2d driven for movement, a head 3 housing a CCD (charge coupled device) video camera 11 (Fig.2), and a trunk 4. The pet type robot 1 is configured to walk autonomously in association with the inputs from variable sensors, such as a touch sensor 20 of Fig.2 as later explained, based on a program (emotional model) determining its own behavior.

[0016]

Fig.2 shows the internal electric configuration of the pet type robot 1. The picture data picked up by a CCD video camera 11 is sent to a signal processing unit 12. This signal processing unit 12 processes the picture data routed from the CCD video camera 11 to memorize the picture data over an internal bus 18 into the memory card 13 or a DRAM (dynamic random access memory) 16.

[0017]

A CPU (central processing unit) 15 reads out the operating program stored in a flash ROM (read-only memory) 17 over the internal bus 18 to control the entire system. The operating program of the CPU 11, stored in the flash ROM 17, can be formulated or modified by an external personal computer (PC) 31 connected to the

signal processing unit 12.

[0018]

The signals detected by potentiometers 19a to 19d, a touch sensor 20 and a microphone 21 are routed through branching portions 24a to 24e to the signal processing unit 12, which signal processing unit 12 routes signals sent from the branching portions 24a to 24e over the internal bus 18 to the CPU 15. The CPU 15 controls the operation of the actuators 22a to 22d and the legs 2a t o2d as well as the head 3 driven thereby, based on the supplied signals. The CPU 15 controls the speech outputted from the speaker 23.

[0019]

It is noted that the potentiometers 19a to 19c, touch sensor 20, microphone 21, actuators 22a to 22d and speaker 23 constitute the legs, ears and mouth of the pet type robot 1 and are collectively termed a CPC (configurable physical component) device.

[0020]

Fig.3 shows an illustrative structure of the signal processing unit 12.

[0021]

A DRAM interface 41, a host interface 42 and a ROM interface 43 are connected to the DRAM 16, CPU 15 and to the flash ROM 17, while being connected to an external bus 44. A bus controller 45 controls the external bus 44, whilst a bus arbiter 46 arbitrates between the external bus 44 and an internal bus 47.

[0022]

To a parallel port 48 and a serial port 50 is connected a personal computer (PC) 31 as an external development environment. A battery manager 49 manages the residual capacity of a battery, not shown. The parallel port 48, battery manager 49 and the serial port 50 are connected over a peripheral interface 53 to the internal bus 47.

[0023]

The CCD video camera 11 furnishes the pictured picture data to a filter bank FBK 56, which then thins out supplied picture data to formulate picture data of variable resolutions. These picture data are routed over the internal bus 47 to a direct memory access (DMA) controller 51. The DMA controller 51 transfers the furnished picture data to the DRAM 16 for storage therein.

[0024]

The DMA controller 51 causes the picture data stored in the DRAM 16 to be read out and routed to an IPE (inner product engine) 55. The IPE 55 executes pre-set calculations using the furnished picture data. The calculated results are transferred to the DRAM 16 in accordance with commands from the DMA controller 51 for storage therein.

[0025]

To a USB (universal serial bus) host controller 57 is connected a CPC device 25, which CPC device 25 is made up of, for example, the potentiometers 19a to 19d, touch sensor 20, microphone 21, actuators 22a to 22d and the speaker 23. The speech data furnished from the CPC device 25 are furnished via the USB host

controller 57 to a DSP (digital signal processor) 52, which then executes pre-set processing on the furnished speech data. To the USB interface 58 is connected the personal computer (PC) 32 as an eternal developing environment. A timer 54 routes time information to respective components over the internal bus 47.

[0026]

A emotional model 64 of the pet type robot 1 is constructed as shown for example in Fig.4.

[0027]

The sensors 61 to 63 detect stimuli applied from outside, such as environment, to convert the stimuli into electrical signals, which are outputted. These electrical signals are sent to input evaluation units 71, 72. It is noted that the sensors 61 to 63 are comprised not only of the potentiometers 19a to 19d, touch sensor 20, microphone 21, but of a speech recognition sensor and a picture color recognition sensor etc, and converts the actuations by the user in taking care of the robot 1 or the speech the or she enunciated into electrical signals, which are outputted. Outputs of the sensors 61 to 63 are routed to the input evaluation units 71, 72.

[0028]

The input evaluation unit 71 evaluates the electrical signals furnished from the sensors 61 to 63 to detect a pre-set emotion. This pre-set emotion may, for example, be the emotion of pleasure. The input evaluation unit 71 sends an evaluation value of the detected emotion to an emotion module 73. To the emotion module 73 is allocated

a pre-set emotion (e.g., pleasure) such that the emotion parameter is increased or decreased based on the evaluated emotion value furnished by the input evaluation unit 71. The emotion module 73 sends the emotion parameter to an output selection unit 75.

[0029]

Similarly, the input evaluation unit 72 evaluates the electrical signals furnished from the sensors 61 to 63 to detect the pre-set emotion. The pre-set emotion here is, for example, the emotion of anger. The input evaluation unit 72 sends the detected evaluation value of the emotion to an emotion module 74. To the emotion module 74 is allocated a pre-set emotion (e.g., anger) such that the emotion parameter is increased or decreased based on the evaluated emotion value furnished by the input evaluation unit 72. The emotion module 74 sends the emotion parameter to the output selection unit 75.

[0030]

The output selection unit 75 checks whether or not the emotion parameter supplied from the emotion modules 73, 74 exceeds a pre-set threshold value, and outputs the emotion parameter exceeding the threshold value. If the two emotion parameters from the emotion modules 73, 74 exceed the threshold value, the output selection unit 75 selects a larger one to output the selected parameter.

[0031]

A behavior generator 65 converts the emotion supplied from the output

selection unit 75 into a command instructing a specified behavior to route the command to an output unit 66 while feeding the command back to an output evaluation unit 76.

[0032]

The output evaluation unit 76 evaluates the behavior supplied from the behavior generator 65 and, if the behavior is performed, the output evaluation unit 76 performs control to decrease the emotion parameter corresponding to the behavior.

[0033]

An output unit 66 makes an output consistent with a behavior command from the behavior generator 65. The output unit 66 issues an output of the pet type robot 1 which then behaves in accordance with a behavior command from the behavior generator 65. That is, the output unit 66 is made up of the actuators 22a to 22d and the speaker 23 driving the components such as legs 2a t o2d, head 3 or the trunk 4, and drives pre-set actuators to turn the head 3 or issue a whining or meowing sound.

[0034]

In the following explanation, it is assumed that the "pleasure" and "anger" are allocated to the emotion modules 73, 74, respectively. It is also assumed that the sensors 61, 62 and 63 are a picture color recognizing sensor, a voice recognizing sensor and a touch sensor 20, respectively.

[0035]

When fed from the picture color recognizing sensor 61, voice recognizing

sensor 62 and from the touch sensor 63 with electrical signals associated with the "yellow", electrical signals corresponding to a pre-set frequency, such as "re" and with electrical signals corresponding to the "caressing" state, respectively, the input evaluation unit 71 evaluates the respective signals to determine the evaluation value for "pleasure". The input evaluation unit 71 routes the evaluation value "pleasure" to the emotion module 73. The emotion module 73 increases the emotion parameter based on the evaluation value for "pleasure". The emotion parameter is routed to the output selection unit 75.

[0036]

When fed from the picture color recognizing sensor 61, voice recognizing sensor 62 and touch sensor 63 with electrical signals associated with the "red", electrical signals corresponding to a pre-set frequency, such as "fa" and with electrical signals corresponding to the "hitting" state, respectively, the input evaluation unit 72 evaluates the respective signals to determine the evaluation value for " anger". The input evaluation unit 72 routes the evaluation value " anger" to the emotion module 74. The emotion module 74 increases the emotion parameter based on the evaluation value for " anger". The emotion parameter is routed to the output selection unit 75.

[0037]

The output selection unit 75 checks whether or not the emotion parameter supplied from the emotion modules 73, 74 exceeds a pre-set threshold value. It is assumed here that the emotion "anger" exceeds a threshold value.

[0038]

The behavior generator 65 converts the emotion parameter for "anger" supplied from the output selection unit 75 into a command instructing a specified behavior (barking) to route the command to the output unit 66 , while causing the command to be fed back to the output evaluation unit 76.

[0039]

The output unit 66 issues an output in accordance with a behavior command (barking) from the behavior generator 65. That is, the output unit 66 outputs the corresponding sound. The "anger" is released by the pet type robot 1 barking so that its emotion of "anger" is suppressed. In this consideration, the output evaluation unit 76 decreases the emotion parameter of the emotion module 74.

[0040]

Meanwhile, the above-mentioned output of the emotional model 64 is the emotion parameter differentiated with respect to time. That is, the larger the variation in the emotion parameter, the larger becomes an output of the emotional model 64. For example, if the emotion parameter "anger" of the pet type robot 1 is of a larger magnitude, the emotion parameter "pleasure" is rapidly changed (increased) by the robot viewing the yellow ball it likes. In this case, the picture data captured from the CCD video camera 11 is verified by the pet type robot 1 as being valid picture data so that it is stored in memory means such as the memory card 13.

[0041]

The processing for storing effective data into the memory card 13 in the pet type robot 1 is hereinafter explained with reference to the flowchart of Fig.5.

[0042]

First, at step S1, the CPU 15 checks whether or not an output value of the emotional model 64 has exceeded a pre-set threshold. If it is decided at step S1 that the output value of the emotional model 64 has not exceeded the pre-set threshold value, the CPU 15 reverts to step S1. If, at step S1, the output value of the emotional model 64 is found not to exceed the pre-set threshold, the CPU 15 advances to step S2.

[0043]

At step S2, the CPU 15 checks whether or not there is any vacant area in the memory card 13. If, at step S2, it is found that there is a vacant memory area, the CPU 15 advances to step S3 to cause the picture data captured from the CCD video camera 11 to be stored in the vacant area of the memory card 13. The CPU 15 then causes the time and date data and the emotion parameter, in association with the picture data, as the characteristic information of the picture data.

[0044]

At step S4, the CPU 15 re-arrays the picture data in the order of the decreasing magnitudes of the emotional model 64. The CPU 15 then reverts to step S1. That is, the memory area of the memory card 13 is made up of a header 81 memorizing the time and date data and the emotion parameter as the characteristic information and a picture data portion 82 memorizing the picture data, as shown in Fig.6. The CPU 15

sorts the picture data in the order of the decreasing magnitude of the emotion output.

[0045]

If it is found at step S2 that there is no vacant memory area, the CPU 15 advances to step S5, where the CPU 15 checks whether or not the current output value of the emotional model 64 is larger than the smallest value of the emotion output accompanying the picture data memorized in the memory card 13. That is, the CPU 15 checks whether or not the current output value is larger than the value of the emotion output arrayed at the lowermost row in Fig.6. If it is found at step S5 that the current output value is not larger or smaller than the smallest value of the memorized emotion output, the CPU 15 reverts to step S1.

[0046]

If it is found at step S15 that the current output value is larger than the smallest value of the memorized emotion output, the CPU 15 advances to step S6 where the CPU 15 erases picture data corresponding to the smallest value of the emotion output. The CPU 15 then advances to step S3 to cause storage of the then prevailing emotion output. This causes the emotion output to be stored to the memory card 13 sequentially in the order of the decreasing magnitude of the emotion output.

[0047]

The processing in case effective data stored in the storage means by the pet type robot 1 is read out by the personal computer 31 is hereinafter explained with reference to the flowchart shown in Fig.7.

[0048]

First, the user extracts the memory card 13 from the PC card slot 14 to load the memory card 13 in a card slot, not shown, in the personal computer 31. When the memory card 13 is loaded in the card slot, the CPU, not shown, enclosed in the personal computer 31 reads out at step S11 picture data stored in the memory card 13. (The picture data are read out in the order of the decreasing magnitudes of the emotion output.)

[0049]

At step 12, the CPU re-arrays the read-out picture data in the chronological order of the date and time data to proceed to step S13. At step S13, the CPU stores the re-arrayed picture data in a memory, not shown, to terminate the processing.

[0050]

This allows the user to read out picture data at any time on the personal computer 31. Therefore, the user can read out picture data to enjoy the picture data as an album recording the life of the pet type robot 1.

[0051]

In the above-described embodiment, data is mainly stored on the memory card 13 . This, however, is not limitative since data can be memorized in the DRAM 16.

[0052]

In this specification, the system refers to logical integration of a plurality of devices, regardless of whether the respective constitutent devices are provided in the

same casing or not.

[0053]

In this specification, the providing medium for supplying a computer program executing the above processing may be exemplified by a transmission medium on a network, such as Internet or digital satellite, in addition to the information; recording medium, such as a magnetic disc or a CD-ROM.

[0054]

[Effect of the Invention]

As described above, according to the robot apparatus of claim 1, the control method for a robot apparatus of claim 4 and the providing medium of claim 5, since data corresponding to the output of the emotional model is stored in the case where it is discriminated that the output of the emotional model is greater than a predetermined threshold value, the cost required for the memory can be reduced.

[Brief Description of the Drawings]

Fig.1 is an appearance view of a pet type robot 1 embodying the present invention.

Fig.2 is a diagram showing an innate electrical structure of the pet type robot 1.

Fig.3 is a diagram showing a detailed structure of a signal processing unit 12.

Fig.4 is a diagram for illustrating the emotional model 64.

Fig.5 is a flowchart for illustrating the processing of memorizing effective data

onto a memory card 13.

Fig.6 illustrates the storage structure of the memory card 13.

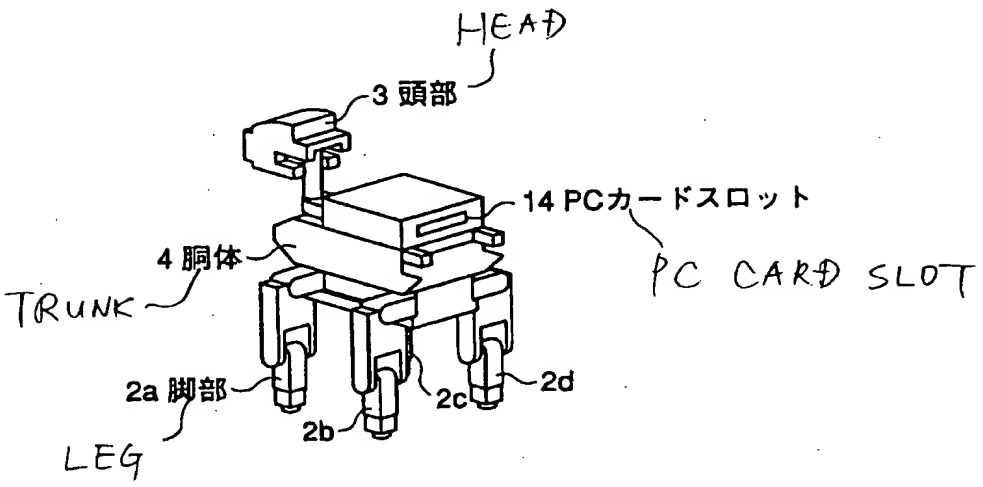
Fig.7 is a flowchart for illustrating the operation of reading out image data stored in the memory card 13.

[Description of the Numerals]

1 pet type robot; 2a to 2d leg; 3 head; 4 trunk; 11 CCD video camera; 12 signal processing unit; 13 memory card; 14 PC card slot; 15 CPU; 16 DRAM; 17 flash ROM; 18 internal bus; 19a to 19c potentiometer; 20 touch sensor; 21 microphone; 22a to 22d actuator; 23 speaker; 24a to 24e branching unit; 31 PC; 41 DRAM I/F; 42 host I/D; 43 ROM I/F; 44 external bus; 45 bus controller; 46 bus arbiter; 47 internal bus; 48 parallel port; 49 battery manager; 50 serial port; 51 DMA controller; 52 DSP; 53 peripheral I/F; 54 timer; 55 IPE; 56 FBK; 57 USB host controller; 58 USB I/F; 61 to 63 sensor; 64 emotional sensor; 65 behavior generator; 66 output unit; 71, 72 input evaluation unit; 73, 74 emotion module; 75 output selection unit; 76 output evaluation unit; 81 header; 82 picture data portion

[DOCUMENT NAME] DRAWING

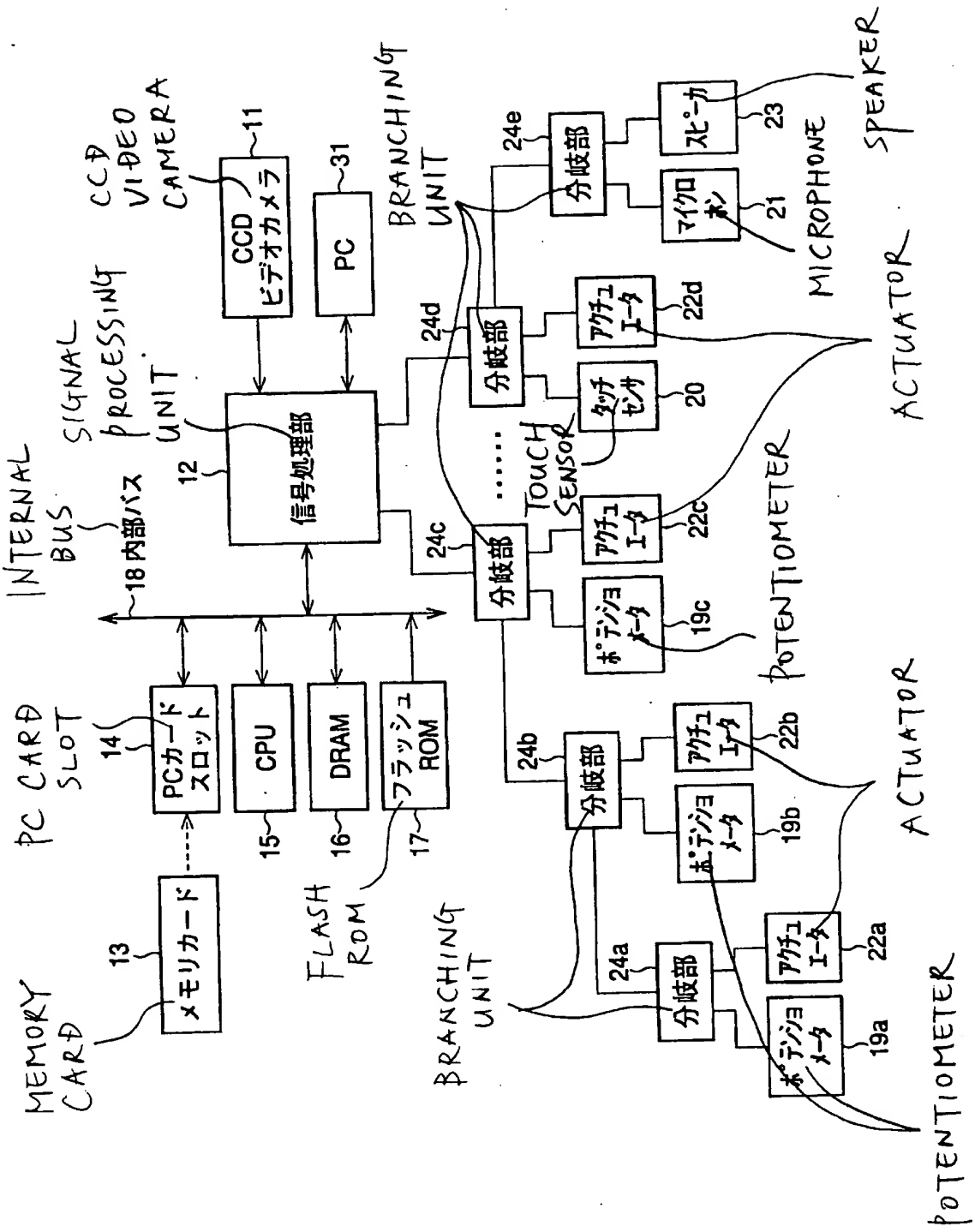
[FIG. 1]



ペット型ロボット1

PET TYPE ROBOT

[FIG. 2]


MEMORY CARD
メモリカード
13
PC CARD SLOT
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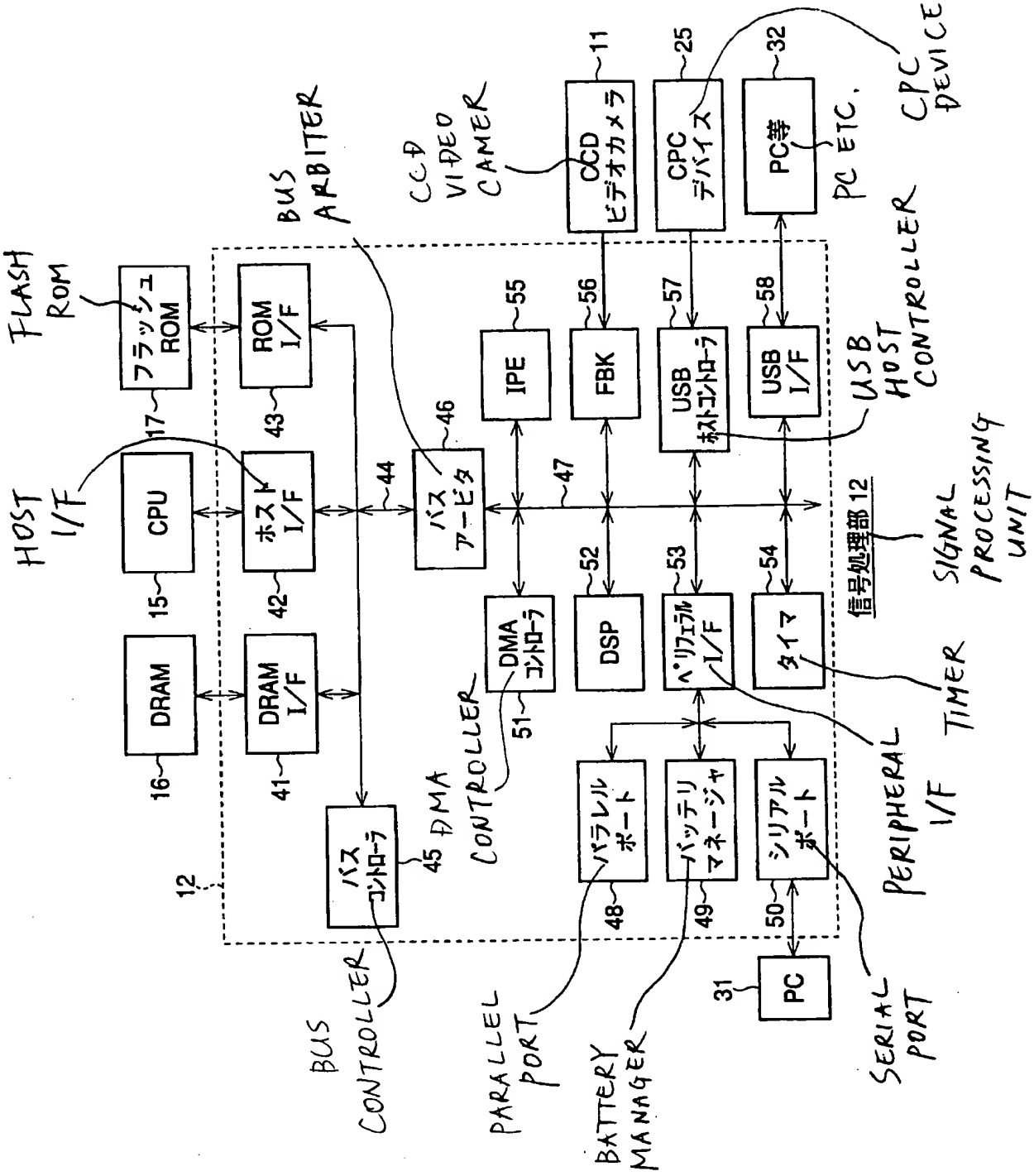
14
CPU
15
DRAM
16
FLASH ROM
フラッシュROM
17
INTERNAL BUS
18 内部バス
SIGNAL PROCESSING UNIT
12
信号処理部
CCD VIDEO CAMERA
CCDビデオカメラ
11
PC
31
BRANCHING UNIT
分岐部
24a
24b
24c
24d
24e
TOUCH SENSOR
タッチセンサ
20
MICROPHONE
マイクロホン
21
SPEAKER
スピーカ
23
ACTUATOR
アクチュエータ
22a
22b
22c
22d
POTENTIOMETER
ポテンショメータ
19a
19b
19c

[FIG. 3]


FLASH ROM
フラッシュ ROM
ROM I/F
BUS ARBITER
CCD VIDEO CAMER
CCD ビデオカメラ
CPC デバイス
CPC DEVICE
PC等
PC ETC.
HOST I/F
CPU
ホスト I/F
バス アービタ
IPE
FBK
USB ホストコントローラ
USB I/F
USB HOST CONTROLLER
DRAM
DRAM I/F
DMA コントローラ
DSP
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SIGNAL PROCESSING UNIT
DMA CONTROLLER
TIMER
バス コントローラ
パラレル ポート
バッテリ マネージャ
シリアル ポート
PERIPHERAL I/F
BUS CONTROLLER
PARALLEL PORT
BATTERY MANAGER
SERIAL PORT
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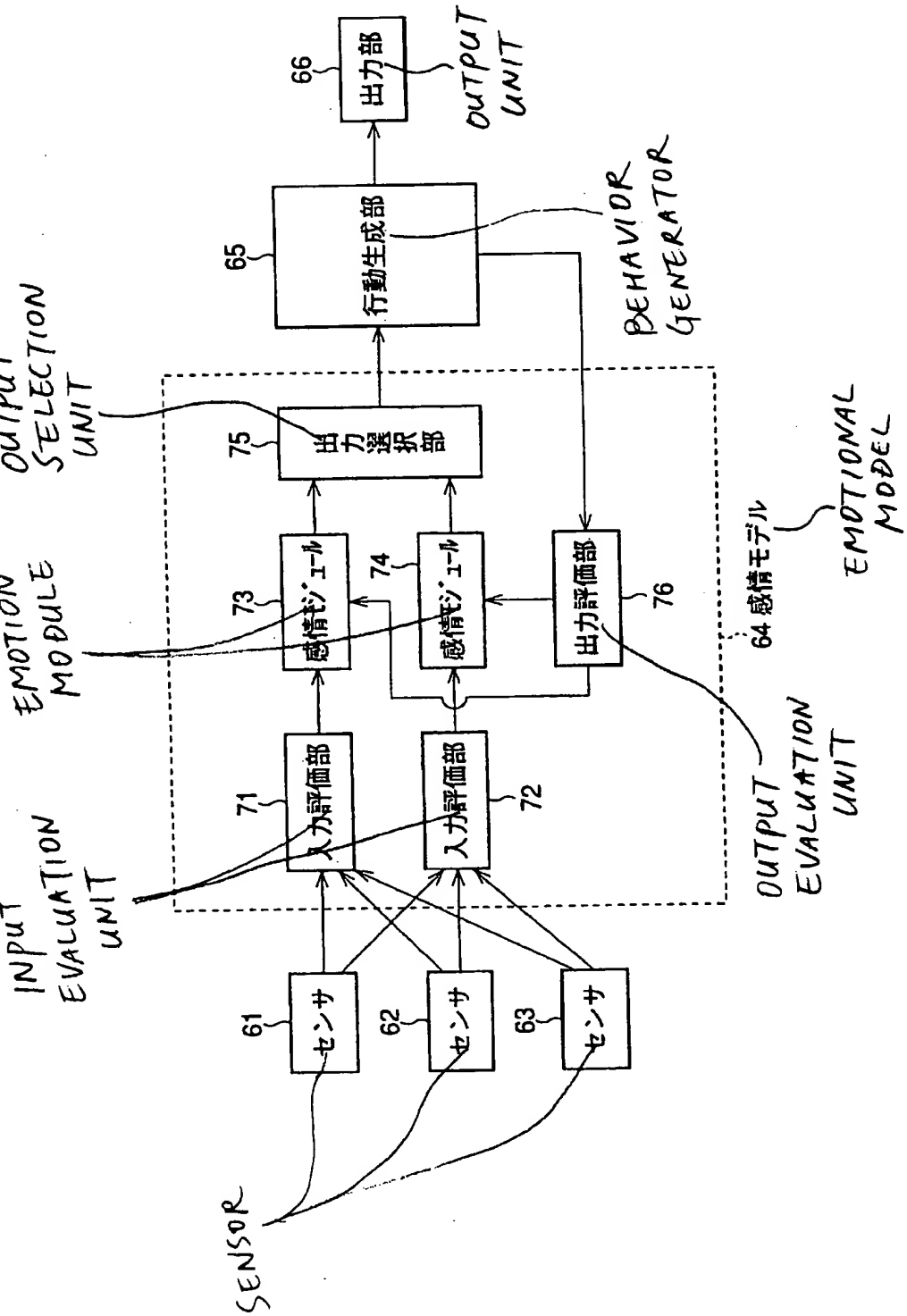
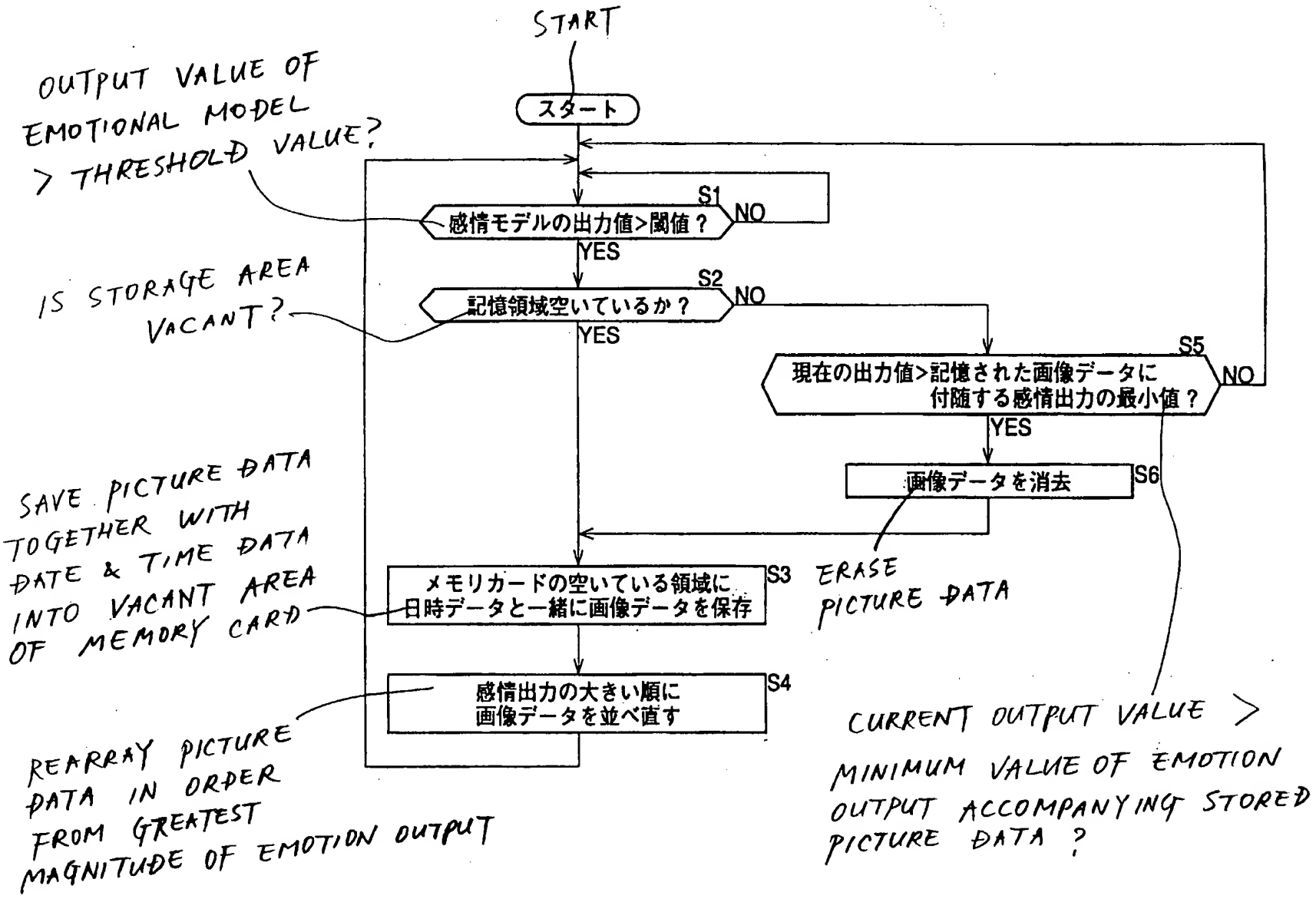
32

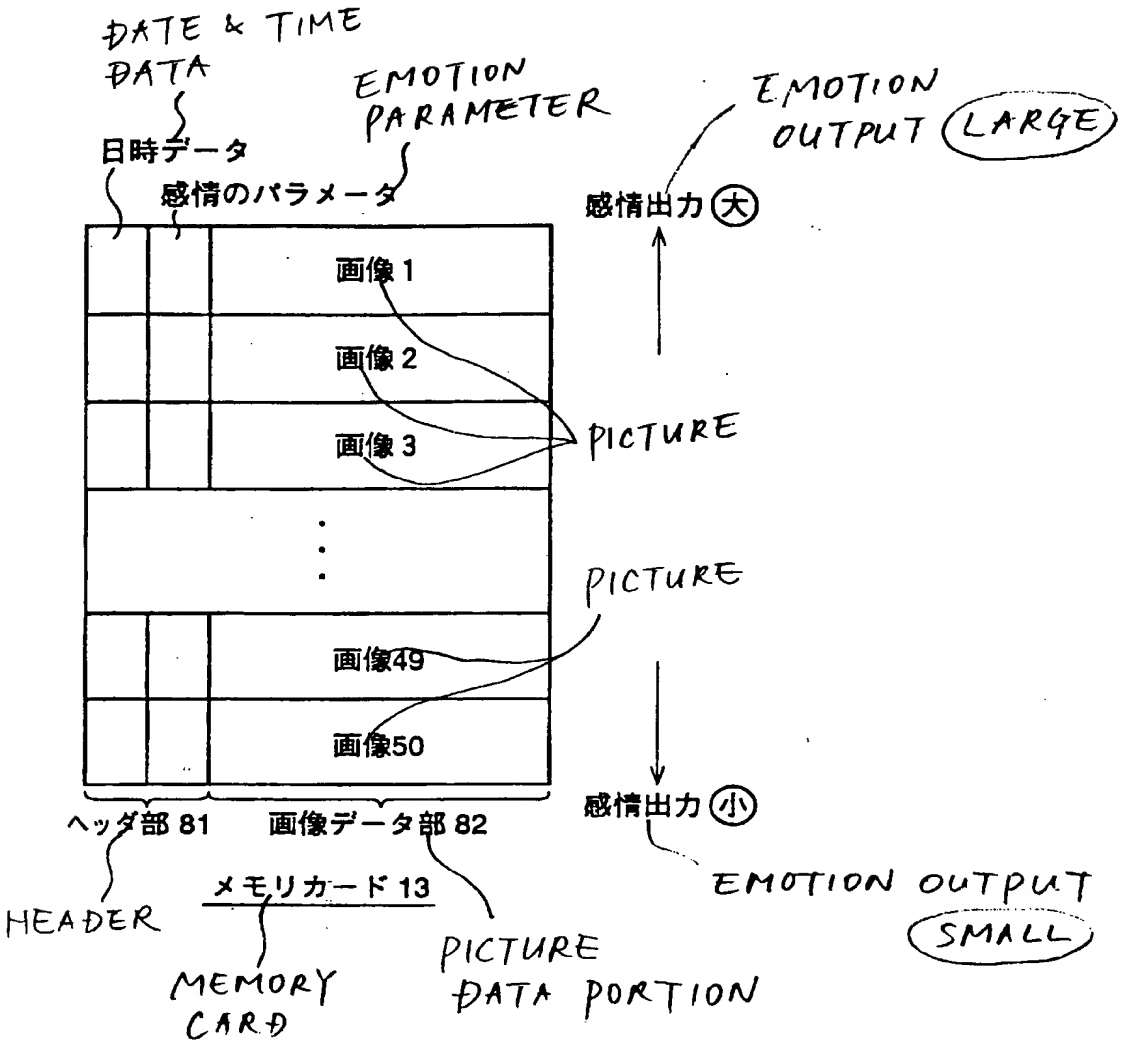
[FIG. 4]


SENSOR
61
センサ
62
センサ
63
センサ
INPUT EVALUATION UNIT
71
入力評価部
72
入力評価部
EMOTION MODULE
73
感情ジュール
74
感情ジュール
OUTPUT EVALUATION UNIT
出力評価部
76
64 感情モデル
EMOTIONAL MODEL
OUTPUT SELECTION UNIT
75
出力選択部
BEHAVIOR GENERATOR
65
行動生成部
OUTPUT UNIT
66
出力部

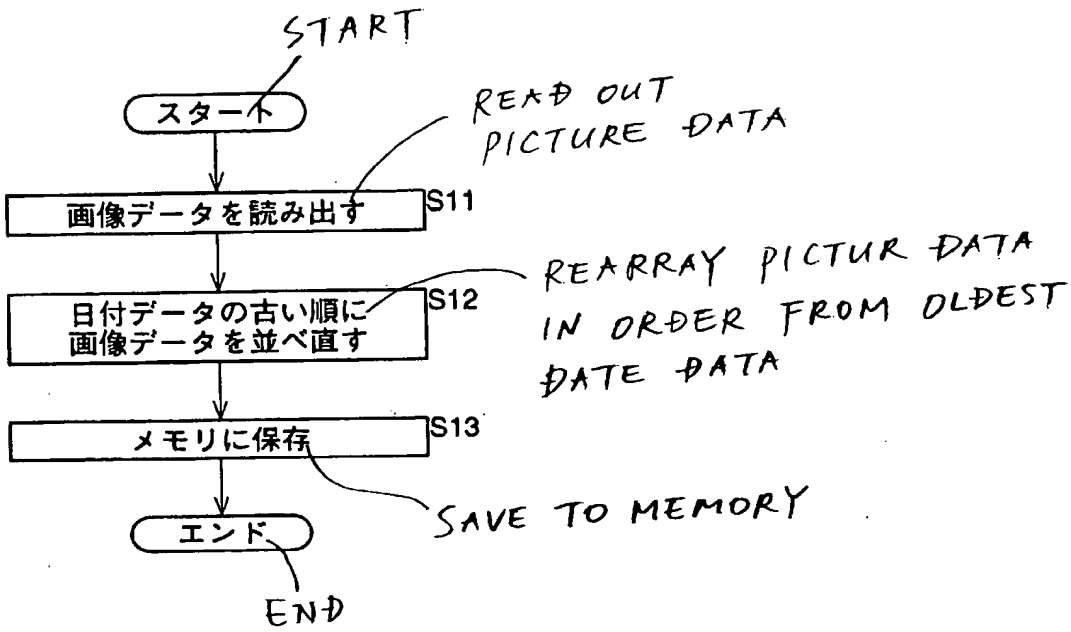
[FIG. 5]


START
スタート
OUTPUT VALUE OF EMOTIONAL MODEL > THRESHOLD VALUE?
S1
感情モデルの出力値>閾値？
NO
YES
IS STORAGE AREA VACANT?
S2
記憶領域空いているか？
NO
YES
S5
現在の出力値>記憶された画像データに付随する感情出力の最小値？
NO
YES
画像データを消去
S6
ERASE PICTURE DATA
SAVE PICTURE DATA TOGETHER WITH DATE & TIME DATA INTO VACANT AREA OF MEMORY CARD
メモリカードの空いている領域に日時データと一緒に画像データを保存
S3
REARRAY PICTURE DATA IN ORDER FROM GREATEST MAGNITUDE OF EMOTION OUTPUT
感情出力の大きい順に画像データを並べ直す
S4
CURRENT OUTPUT VALUE > MINIMUM VALUE OF EMOTION OUTPUT ACCOMPANYING STORED PICTURE DATA ?

[FIG. 6]


DATE & TIME DATA
日時データ
EMOTION PARAMETER
感情のパラメータ
EMOTION OUTPUT LARGE
感情出力 大
画像 1
画像 2
画像 3
PICTURE
PICTURE
画像49
画像50
感情出力 小
EMOTION OUTPUT SMALL
ヘッダ部 81
画像データ部 82
メモリカード 13
HEADER
MEMORY CARD
PICTURE DATA PORTION

[FIG. 7]


START
スタート
READ OUT PICTURE DATA
画像データを読み出す
S11
REARRAY PICTUR DATA IN ORDER FROM OLDEST DATE DATA
日付データの古い順に画像データを並べ直す
S12
メモリに保存
S13
SAVE TO MEMORY
エンド
END

[Name of Document] ABSTRACT

[Summary]

[Task]

To reduce the cost required for the memory.

[Means for Solution]

A CPU 15 determines an output of a emotional model based on signals supplied from a touch sensor 20. The CPU 15 also deciphers whether or not an output value of the emotional model exceeds a pre-set threshold value. If the CPU finds that the output value exceeds the pre-set threshold value, it verifies whether or not there is any vacant area in a memory card 13. If the CPU finds that there is any vacant area in a memory card 13, it causes the picture data captured from the CCD video camera 11 to be stored in the vacant area in the memory card 13. At this time, the CPU 15 causes the time and date data and the emotion parameter in the memory card 13 in association with the picture data. The CPU 15 also re-arrays the picture data stored in the memory card 13 in the sequence of the decreasing magnitude of the emotional model output.

[Selected Drawing] Fig.2

[Document Name] Official Correction Data

[Corrected Document] Patent Application

<Authorized Information · Additional Information>

[Patent Applicant]

[Identification Number] 000002185

[Address] 7-35, Kitashinagawa 6-chome,
Shinagawa-ku, Tokyo, Japan

[Name] Sony Corporation

[Agent] Applicant

[Identification Number] 100082131

[Address] Inamoto International Patent Firm
GOWA Nishi-Shinjyuku BLDG.
6F, 5-8, Nishi-Shinjyuku 7-chome,
Shinjyku-ku, Tokyo,
Japan

[Name] Yoshio Inamoto

Information of Record for Applicant

Identification Number: [000002185]

1. Date of Change: August 30, 1990

[Reason of Change] Registration

[Address] 7-35, Kitashinagawa 6-chome,

Shinagawa-ku, Tokyo, Japan

[Name] Sony Corporation